

## **Oceanography with GPS**

Cinzia Zuffada, Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Dr., MS 238-600, Pasadena, CA 91109, USA. [Cinzia.zuffada@jpl.nasa.gov](mailto:Cinzia.zuffada@jpl.nasa.gov) .  
Phone: 818 354 0033. Fax: 818 393 4965.

Recent efforts are under way to use GPS signals scattered off the ocean and sensed by an air- or space-borne receiver in a bistatic radar geometry, as a means of doing altimetry and scatterometry. The advantage of GPS is twofold: the transmitted signal is always globally present and the receiver technology is inexpensive, compared to alternative remote sensing systems. Upon impinging on the ocean surface, the GPS signal is reflected primarily in the specular (forward) direction, in an amount dependent on surface roughness and angle of incidence. An airborne or space-borne receiver, connected to a down-looking antenna, can collect such scattered signals. One such receiver, and the 24 transmitters, form a multistatic radar system, capable of intercepting reflections from several areas of the ocean simultaneously. By analogy to traditional altimetry, the bistatic GPS reflected signal are analyzed to derive the important descriptors of the ocean surface; i.e. ocean height and surface wind vector. Because of the nature of the GPS observations, they can improve our current capability of global sea surface measurements in two important ways: improved spatio - temporal resolution and coverage.

The communication will open with a review of the state-of-the-art in technology development and science demonstrations. Additionally, the most recent findings on sea-surface height from airplane altitude will be presented and the resolution and accuracy will be discussed. In particular, it is shown that the precision is suitable for eddy monitoring, on a temporal scale much shorter than that allowed by TOPEX/Poseidon and JASON. Coastal altimetry performed at the Harvest platform will complement the suite of altimetry experiments illustrated, pointing out the measurement ability for coastal monitoring. Next, the roadmap to future developments will be outlined, describing the basic features that future systems must have for space based oceanography and the advantages over existing technology.

Oral presentation  
Oceanography